ANNEX G

BIOLOGICAL EVALUATION FOR JOHNSON'S SEAGRASS

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BIOLOGICAL EVALUATION
HERBERT HOOVER DIKE
MAJOR REHABILITATION AND EVALAUTION REPORT

1. Project Description:

The Herbert Hoover Dike (HHD) built around Lake Okeechobee in south central Florida was originally constructed as a series of embankments by local interests in 1915 in order to provide flood protection to the surrounding communities and controlled irrigation for local agriculturists. These embankments were improved to the current levee system by the U.S. Army Corps of Engineers (Corps) during the 1930s and 1940s, and major culvert modifications were accomplished in the 1970s. Since then, only as-needed repairs have been made to the HHD. Recent high water events have caused several boils and pipings around the dike, suggesting the need for major rehabilitation. The Corps is preparing a series of HHD Major Rehabilitation Evaluation Reports (MRR) which document seepage and stability concerns along the HHD system and provide rehabilitation options. The initial MRR and this EIS focuses on Reach One, the southeastern portion of the HHD, and proposes five alternative actions for rehabilitation. The Preferred Alternative includes a pervious cutoff wall and a relief trench on the landward slope of the dike and within the HHD's existing footprint. A Supplemental Draft Environmental Impact Statement (SDEIS) has been prepared to examine the effects of the proposed actions

It involves construction of approximately 22 miles of a pervious hanging cut-off wall on the landward side of the dike, at approximately 26-ft NVGD, and a relief trench in Reach One of the HHD on the lakeward side of the existing dike's toe ditch. It minimizes the project's footprint to existing HHD's footprint as well as reduces overall impacts to the natural system when compared to the other alternatives.

The design of the preferred alternative includes a hanging seepage cutoff wall on the landward side of the dike slope and a relief trench with an inverted filter and relief berm at the toe of the landward slope of the dike, stopping at the dike's toe ditch. The cut-off wall will be at the approximate 26' elevation on the HHD slope, excavation stopping prior to the impervious geologic layer. This will allow groundwater to flow beneath the HHD and underseepage to be collected by the relief trench. The relief trench and inverted filter will be constructed adjacent to the existing toe ditch and within the HHD footprint at the landward toe. An access road would be built on top of the relief trench. Seepage water from the seepage toe berm and relief trench would flow freely into the existing toe ditch. The toe ditch geometry may have to be altered on the lakeward side of the ditch due to construction of the trench and drain system. The final design has to insure no negative impact of flood control. This may cause some slight design changes in certain areas (i.e., length of cutoff wall), but the impact of the design would encompass less land than the original MRR solutions (Alts. 1 through 3).

2. Species and Suitable/critical habitat:

Johnson's seagrass (*Halophila johnsonii)* has a limited distribution, reported as occurring only in the coastal lagoons of east Florida from Sebatian Inlet to Biscayne Bay (Eiseman 1980).

It often grows in patches between intertidal zones to 3 meters water depth (Federal Register 2002). Although it is found in both firm sediments and sandy mud substratum, it favors firm substrate (Eiseman 1980). Reproduction is different than most seagrasses in that it is believed to uniquely have asexual reproduction characteristics. This assumption is supported by no known identification of male flowers. The decline of this species could partially be attributed to this. Johnson's seagrass is ecologically significant. It provides habitat, nursery, and foraging areas for various flora and fauna, including the West Indian Manatee. It plays a major role in the viability of benthic resources. (NMFS website).

The Herbert Hoover Dike Major Rehabilitation and Evaluation report proposes to implement an alternative to rehabilitate the failing dike system that currently impounds water in Lake Okeechobee. The proposed modifications to the dike structure would not alter the management of the lake, or discharges into tributaries. It also would not have any effects to Lake Okeechobee stages or water quality. All work will be completed within the landward side of the dike footprint. The rehabilitation would however, reduce seepage through the dike levees and change ground water in the immediate project vicinity. Toe canals, some of which connect to and discharge into the St. Lucie Canal and the Hillsboro Canal, will be temporarily impacted by soil disturbances as an inverted drain system is constructed adjacent to the ditches and in the toe of the dike. After construction, it is anticipated these rim canals would capture under-seepage of the dike.

Critical habitat for Johnson's seagrass is designated in a portion of the Indian River Lagoon, north of the Sebastian Inlet Channel; a portion of the Indian River Lagoon, south of the Sebastian Inlet Channel; a portion of the Indian River Lagoon near the Fort Pierce Inlet; a portion of the Indian River Lagoon, north of the St. Lucie Inlet; a portion of Hobe Sound; a site on the south side of Jupiter Inlet; a site in central Lake Worth Lagoon; a site in Lake Worth Lagoon, Boynton Beach; a site in Lake Wyman, Boca Raton; and a portion of Biscayne Bay.

Although it is unlikely that any changes in flows or water quality would be detected at this distance from the project site, critical habitat is identified in or adjacent to the downstream ranges of influence. Downstream of the project, the St. Lucie Canal connects to the St. Lucie Estuary where critical habitat is north of the canal outfall at Hutchinson Island. The Hillsboro Canal discharges south of Boca Raton and critical habitat in Lake Wyman. There is no Johnson's seagrass in the project area.

3. Threats:

Johnson's seagrass has limited distributional characteristics, restricted reproductive capacity (being asexual), and is dependent on substrate stability (NMFS website). Additional threats to recovery include human and natural events that alter condition substrate or water quality on which the seagrass depends. For instance, boat traffic, dredging and maintenance of waterways, and storm activities, including hurricanes, can result in prop scoring or substrate removal, turbid waters, siltation, salinity fluctuations, sediment resuspension, and water quality contamination.

4. Effects of the Proposed Action:

a. Direct Effects: Implementation of the proposed alternative will temporarily cause turbidity in the toe canals of the dike. Some of these canals are connected to the St. Lucie Canal, Hillsboro Canal, or tributaries. Changes to flow to the St. Lucie and Hillsboro Canals are not anticipated to be significant. Changes in water quality may be anticipated but limited to construction time and caused by turbidity in adjacent canals and toe ditched. To alleviate any downstream affects, strict turbidity and erosion control measures will be followed through out construction. Changes to hydrology and seepage will be localized effects, and should have no affect beyond a few 100 feet of the dike.

b. Indirect Effects: Toe canals would be designed to capture seepage under the canal. This may cause additional water availability and flows to the St. Lucie Canal or Hillsboro Canals. However, this water without project would also ultimately end up in the basin, as it would seep under the dike as it does currently, or cause pipings or leaks, that uncontrolled, could bring large discharges and turbidity to downstream environments. It would be anticipated that water seeping through the dike and into the toe ditch collection system would have better water quality than direct releases into canals or overland flow.

c. Effects of Interrelated and Interdependent Actions: Operations for Lake Okeechobee Regulation Schedule are currently under review. High water events are damaging to both the ecosystem of the lake and the dike. Maintaining high stages in the lake increases likelihood of dike failure as well as number and severity of uncontrolled piping and boilings. Future Reaches of the dike will not have an effect to the St. Lucie Estuary or designated critical habitat adjacent to Hutchinson Island. Construction of Reach 2 may have additional short term impacts to Hillsboro Canal as the northern portion of the Reach start at the Hillsboro Canal. Rehabilitating the dike will help in management of the regulation schedule and unexpected boils and pipings.

d. Cumulative Effects: Future reaches may affect seperable water bodies or systems listed as critical habitat. However, the changes to hydrology and flow to any of these systems cumulatively are not anticipated to be significant. All direct impacts are anticipated to be within a few hundred feet of the dike. Turbidity would be controlled at all construction sites to avoid impacting toe ditches or adjacent water bodies and canals. No water quality parameters changes are anticipated.

5. Quantity of Incidental Take:

None anticipated.

6. Conservation Measures:

Turbidity screening and diversion will be used to control impacts to the drainage ditches and connected canals. Runoff from the construction site or from storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, and by any measures required by area wide plans approved under paragraph 208 of the Clean Water

Act. Temporary and permanent erosion and sedimentation control features or screening will be installed. Temporary velocity dissipation devices shall be placed along drainage courses so as to provide for non-erosive flows. Temporary erosion and sediment control measures such as berms, dikes, drains, sediment traps, sedimentation basins, grassing, mulching, baled hay or straw, and silt fences shall be maintained until permanent drainage and erosion control facilities are completed and operative. For silt fences, the filter fabric is to be of nylon, polyester, propylene, or ethylene yarn of at least 50 lb/in strength and able to withstand a flow rate of at least 0.3 gal/ft sq/minute. It also would contain ultraviolet ray inhibitors and stabilizers and be a minimum of 36 inches in width.

In addition, during construction, the Contractor will be responsible to keep construction activities under surveillance, management, and control to avoid pollution of surface, ground waters, and wetlands. The Contractor is responsible to conduct all operations in a manner to minimize turbidity and shall conform to all water quality standards as prescribed by Chapter 62-302, State of Florida, Department of Environmental Protection (FDEP).

7. Conclusion:

The Corps has determined implementation of the project may effect, but is unlikely to adversely affect, Johnson's seagrass or listed critical habitat. The proposed modifications to the dike structure would not alter the management of the lake, or discharges into tributaries. All work will be completed within the landward side of the dike footprint. Turbidity will be controlled and managed as to limit impacts to toe ditches, waterways, and canals.

8. References:

Eiseman, N.J. and C. McMillan. 1980. A new species of seagrass, *Halophila johnsonii*, from the Atlantic coast of Florida. Aquat. Bot. 9:15-19.

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Kenworthy, W.J. October 15, 1997. An Updated Biological Status Review for *Halophila johnsonii* Eiseman. Southeast Fisheries Science Center, NMFS, NOAA.

NOAA Fisheries: Office of Protected Resources website. www.nmfs.noaa.gov/pr/species/plants/johnsons.htm

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